

Enhanced Recovery After Surgery Protocols

Rationale and Components

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KEYWORDS

- Enhanced recovery after surgery • ERAS • Hernia • Abdominal wall reconstruction
- Multimodal

KEY POINTS

- Enhanced recovery after surgery (ERAS) represents a multimodal, multidisciplinary approach to enhance surgical outcomes and improve value for the patient and the health care system.
- ERAS protocols seek to minimize surgical stress and its effects through use of evidence-based protocols.
- ERAS protocols include the entire cycle of patient care, including preoperative assessment and optimization, intraoperative technique, and postoperative care.

INTRODUCTION

Enhanced recovery after surgery (ERAS) protocols have been gaining in popularity after their widespread adoption and success in the colorectal literature.^{1,2} The initial development and implementation of ERAS protocols has been widely published, and largely successful in improving certain perioperative outcomes and decreasing hospital length of stay.^{3,4} These successes have led other fields to explore development and implementation of ERAS protocols for a wide variety of surgical diseases, including abdominal wall reconstruction.⁵⁻⁸

ERAS protocols were developed to combat growing health care expenditures by providing a more efficient utilization of health care resources. These protocols have 2 main goals: improving patient outcomes and reducing costs.² Pathway elements

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were selected based on existing literature and applied through a multimodal approach to reduce the effects of surgical stress and to enhance postoperative recovery.¹ The application of various individual elements into organized protocols allowed for significant overall improvement in the care of the surgical patient and evolved into the ERAS movement.

The success in colorectal surgery has led to development of protocols in a wide variety of surgical fields. A meta-analysis performed by Vision⁹ examined ERAS for non-colorectal surgery patients, including 6511 patients, over an array of abdominal procedures. Despite the procedural heterogeneity, there was a reduction in the length of stay by 2.5 days overall and 2.6 days in the randomized controlled trials (RCTs) group. Regarding the other primary outcome of complications, the estimated mean odds ratio (OR) was 0.70 (95% CI 0.56–0.86, $P = .001$), indicating a reduction of complications in the ERAS group. However, this reduction did not reach statistical significance in the RCTs group with an OR of 0.68 (95% CI 0.43–1.10, $P = .12$). Secondary outcomes, including readmission, were similar between groups. Cost data were available in 10 of the studies examined, all of which were RCTs, and demonstrated a mean reduction in cost of \$5109.10 (95% CI \$5852.40–\$4365.80, $P < .001$). The investigators attributed these savings entirely to the decreased length of stay.

There are few studies that directly investigate ERAS protocols when applied to the hernia population.^{6–8,10} ERAS protocols are mostly targeted at patients undergoing open abdominal wall reconstruction because these patients are hospitalized postoperatively. Macedo and colleagues¹⁰ published a systematic review on ERAS protocols in ventral hernias in 2016; only 2 studies met inclusion criteria.^{6,8} The protocols between the 2 studies were significantly different and are compared in [Table 1](#). Despite this, they demonstrated a mean reduction in length of stay of 2.07 days (95% CI –2.6 to –1.5, $P < .0001$) and a trend toward decreased readmission rates in the ERAS group with an OR of 0.46 (95% CI 0.2–1.0, $P = .07$).¹⁰

Jensen and colleagues⁶ examined 32 consecutive subjects undergoing giant ventral hernia repair (VHR). ERAS protocols were implemented and compared retrospectively to a standard care control group. All but 3 patients underwent bilateral endoscopic anterior component separation in addition to laparotomy for reconstruction. The main emphasis in the ERAS protocol included preoperative high-dose glucocorticoid administration (methylprednisolone 125 mg intravenous [IV]) in an effort to attenuate the inflammatory response and lead to low scores of pain, fatigue, and nausea. Other elements differing from the standard pathway included preoperative education on the pathway and expectations of discharge, twice daily discharge assessments, and more aggressive bowel regimens, including gum chewing and scheduled enemas. The complete ERAS protocol is listed in [Table 1](#). The primary endpoint of length of stay was decreased after implementation (median 3.0 vs 5.5 days, $P = .003$). There were no statistically significant differences between the 2 groups with respect to rates of readmission ($P = .394$), postoperative complications ($P = .458$), or reoperation ($P = .172$).

Majumder and colleagues⁸ also examined the implementation of their ERAS protocol for subjects undergoing major open VHR. The technique of choice was retromuscular VHR with posterior component separation via the transversus abdominis muscle release. ERAS protocols were developed and focused on preoperative subject selection and optimization, multimodal pain control, and intestinal recovery. Their complete ERAS protocol is listed in [Table 1](#). The ERAS study cohort began accumulation when there was complete implementation of the protocol; comparison was made with a historical control group of subjects undergoing the same technique of repair. Subjects in the ERAS group demonstrated earlier functional recovery as measured by time to flatus,

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